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Renal cell metastasis to the thyroid gland: An emerging phenomenon

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ABSTRACT

INTRODUCTION: Suspected thyroid malignancies are usually assumed to be primary in origin. Rarely, in 1–3% of cases, the tumour arises from a secondary source such as a melanoma or breast carcinoma. There is a growing body of research concerning metastatic spread of renal cell carcinoma to the thyroid gland. **PRESENTATION OF CASE:** This case report describes the presentation and diagnostic work-up of an 84yr male presenting with a goitre and hoarse voice. Histopathological examination of the excised 95 × 65 × 55 mm tissue mass revealed metastatic clear cell renal cell carcinoma.

DISCUSSION: This disease pattern has become increasingly apparent in recent literature. A literature review of 150 documented cases worldwide showed that the mean interval for this spread to occur is 9 years.

CONCLUSION: There is a need for further investigation into the underlying pathophysiology of this phenomenon and increased awareness from clinicians of its existence.

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1. Introduction

Intra-thyroid metastases are a rare occurrence, and account for 1–3% of all thyroid malignancies [1–6]. Previous research characterized melanoma and breast carcinoma as the commonest primary lesions leading to thyroid metastases, but more recent studies demonstrate that renal cell carcinoma (RCC) is now the most prevalent [1–3,6,7]. The advent of CT scans has led to increased incidental detection rates for renal cell carcinoma [8]. The most common histological subtype is clear cell carcinoma, which occurs in 7 out of 10 people diagnosed with renal cell carcinoma. Typically, primary renal cell carcinoma is treated with surgical resection as the tumour tends to be resistant to both chemotherapy and radiotherapy [8]. There has recently been an emergence of case reports depicting the phenomenon of RCC spreading to the thyroid gland [1–8]. A common theme amongst these cases is a long lag phase between the treatment of RCC and the development of thyroid metastases – with a mean interval time of 9 years [6]. This case report details the presentation of metastatic RCC to the thyroid gland 26 years post-nephrectomy. Following this is a discussion of the work-up and treatment of thyroid metastases, and the implications of this emerging disease phenomenon on clinical practice. This case is reported in line with the SCARE criteria [9].

2. Case report

An 84-year-old Caucasian male presented to the Emergency Department with new onset hoarse voice and subjective shortness of breath. This is on a background of known euthyroid multinodular goitre which was diagnosed fifteen years previously and had recently increased in size. Other past medical history included endovascular repair of abdominal aortic aneurysm, ischaemic heart disease, peripheral vascular disease, benign prostatic hypertrophy and a right nephrectomy for renal cell carcinoma 26 years ago.

Blood tests confirmed euthyroid status and imaging revealed a left thyroid mass with retrosternal extension, measuring 95 mm x 55 mm x 48 mm and causing significant tracheal compression. Staging investigations demonstrated nil foci of metastatic disease. A multi-disciplinary team discussion was held, with the consensus reached to perform inferior thyroid artery embolization and surgical debulking of the mass.

Radiological embolization was unsuccessful due to the patient's peripheral vascular disease and previous endovascular procedure. However, the remainder of the operation proceeded uneventfully and the resected material weighed 119g and measured 95 mm x 65 mm x 50 mm. Histopathological assessment of morphology and immunohistochemistry was consistent with the diagnosis of metastatic clear cell renal cell carcinoma (Fig. 1).

3. Discussion

The appearance of a thyroid lump in a patient with a history of primary non-thyroid malignancy should alert a clinician to consider whether it may be benign or malignant, and in the latter case,

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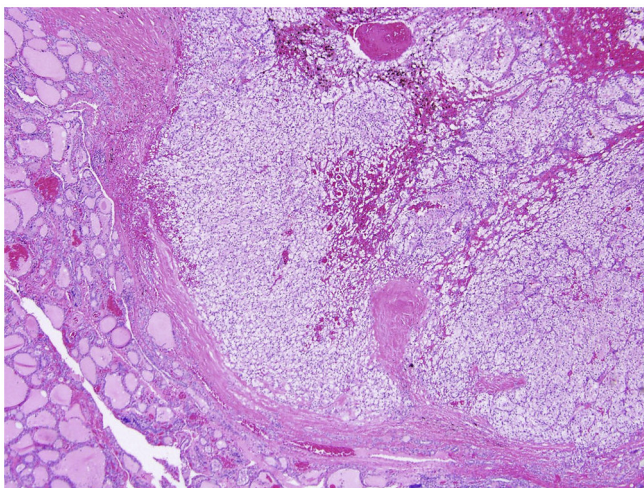


Fig. 1. Clear cell renal cell carcinoma metastasis to Thyroid gland). This was in keeping with the histological subtype of renal cell carcinoma for which a nephrectomy was performed 26 years earlier.

whether it is primary or secondary [6]. Pre-operative distinction between primary and secondary thyroid tumours is challenging [4,10]. Following history and clinical examination, the diagnostic work-up for thyroid enlargement includes an assessment of the functional status [5,10]. Thyroid-stimulating hormone, free T4/T3 and thyroid autoantibodies can provide useful information and direct further testing [10].

Ultrasound imaging is becoming an extension of the clinical thyroid examination, is used as an adjunct when obtaining biopsies, and should be performed in all patients presenting with a new nodule [10]. Radionuclide thyroid scans provide additional information, demonstrating whether nodules are ‘hot’ or ‘cold’ with respect to their functional status. Findings can be complemented with positron emission tomography (PET) scanning [5]. Computed-tomography (CT) scanning is not part of routine investigation for thyroid lump, but may be considered in patients with significant compressive symptoms [10].

The thyroid gland is highly vascularised and on this basis one would expect it to be a common site for metastases [4–7]. Paradoxically, however, metastases only account for 1–3% of all thyroid malignancies [1–6]. Protective factors against metastatic deposits in the thyroid gland are thought to be its high concentration of oxygen and iodine, and the filtering capability of pulmonary capillaries [3,6]. Autopsy studies have suggested that the commonest primary sources of thyroid metastases are melanoma (39%) and breast carcinoma (21%) [3,6,7]. However, a more recent review of clinical cases suggests that renal cell carcinoma now predominates as the leading cause of metastases from non-thyroid malignancies to the thyroid gland (48.1%) [1,2,5].

The pathophysiology of this phenomenon remains speculative, with suggestion that retrograde venous flow may transport cancerous renal cells via the vertebral and epidural systems to the thyroid gland [6]. This route would enable micro-metastases to bypass the pulmonary filtration system [6]. Renal cell carcinoma (RCC) has unpredictable and diverse behaviour, and is becoming increasingly notorious for its late metastases [4,6]. Whilst our case report depicts metastatic spread 26 years after RCC resection, the mean interval for detection of thyroid metastases is 9 years [6]. The literature describes 6–12.5 years between RCC diagnosis and its metastasis to the thyroid gland, with synchronous metastases only occurring in <10% of cases [6,11]. There is a slight female preponderance, with the largest number of cases presenting in the patients aged between 60 and 69 years [3,6].

Surgical treatment options for thyroid metastases include total thyroidectomy with curative intent, or thyroid metastasectomy with palliative intent [2,5,12]. Pre-operative arterial embolization should be considered depending on the size and anatomical location of the metastases. Five-year survival rate following thyroid metastasectomy is approximately 51%, with poorer prognostic factors including widely disseminated multi-organ disease and medical comorbidities [2,4,12]. Favourable prognostic indicators include a longer interval between primary RCC resection and development of thyroid metastases, lack of clinical symptoms, evidence of solitary nodule without widespread metastases, and demonstration of extensive necrosis in the resected specimen [12].

From 1964 to 2007, the literature depicts RCC metastases to the thyroid gland as a rare occurrence, with only 113 documented cases [6]. However, this disease phenomenon is emerging with increasing frequency in recent literature and warrants awareness amongst clinicians when investigating thyroid nodules. Autopsy studies of patients with known metastatic malignancy have suggested that thyroid metastases are under-diagnosed and may occur in up to 20% of patients [2–4]. RCC displays a pattern of late metastatic spread to the thyroid gland, with a median time interval of 6–12.5 years [11]. Further research is needed to elucidate the pathophysiology of delayed metastasis, and how best to clinically detect disease recurrence in its early stages.

Conflicts of interest

Nil.

Funding

Nil.

Ethical approval

Study is exempt from ethical approval by Institution.

Consent

Informed consent was obtained for the publication of this case report. A copy of the consent is available for review by the Editor-in-Chief of this journal on request.

Authors contribution

Nil contributions.

Case report was written by single author.

Guarantor

Catherine Connolly.

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